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Intracranial Abscesses in Ahmadu Bello University Teaching Hospital Zaria, Nigeria

Abdullahi Onimisi Jimoh^{1,*}, Mesi Matthew¹, Dung Apollos Guga¹,
Danjuma Sale³, Fatima Jummai Giwa², Afeez Ajibade Aruna¹

¹Division of Neurosurgery, Department of Surgery, Ahmadu Bello University Teaching Hospital, Zaria, Kaduna State, Nigeria

²Department of Medical Microbiology, Ahmadu Bello University Teaching Hospital, Zaria, Kaduna State, Nigeria

³Department of Surgery, Kaduna State University Teaching Hospital Kaduna, Kaduna State, Nigeria

Email address

sirjimoh2002@yahoo.com (A. O. Jimoh)

*Corresponding author

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Abstract

Intra-cranial abscesses are important causes of morbidity and mortality as they present as space occupying lesions in any of the epidural, subdural, intra-parenchymal or intra-ventricular spaces. It is hoped that this study will identify the clinico-demographic pattern and outcome of management of intracranial abscesses. A retrospective study of patients managed for intra-cranial abscesses in Ahmadu Bello University Teaching Hospital, Zaria between January 2007 – October 2015 was conducted. Medical records of the patients were retrieved from the central library, operating theatres and microbiology laboratory, and relevant information including demographics, neurological status on admission, clinical presentation, predisposing factors, anatomical location, number of lesions, surgical techniques, organisms cultured, and the neurological outcome were extracted. Data were analyzed using SPSS version 21. Thirty seven (37) patients' clinical information were obtained and analyzed. 30 were males (81.1%) and 7 were females (18.9%). The ages ranged between 3 months and 60 years (mean of 21). Intra-cerebral abscess accounted for 67.6% of cases, sub-dural empyema (21.6%), epidural abscess (8.1%), and intra-ventricular abscess 2.1%. More than one lobe was involved in 11 cases (44%). Parietal lobe was the most involved lobe (68%), then frontal (28%) and occipital lobe (24%). Burr hole and free hand drainage was the commonest modality of treatment (63.9%). The mean volume of abscess drained was 65.8mls (8-200mls). Culture yielded no growth in 57.9% (n=19). Isolated organisms include *Escherichiacoli* (21.1%), and *Staphylococcusaureus* (15.8%). 86.6% of operated patients had Glasgow outcome score of ≥ 4 . From our findings, Intra-cerebral abscess is the commonest form of intra-cranial abscess in Zaria affecting males predominantly. Burr hole and drainage is effective, and outcome of surgical management is good.

1. Introduction

Intracranial abscesses are suppurative conditions that occur in any of the intra-cranial epidural, subdural, intra-parenchymal (brain abscess), or intra-ventricular spaces. The

advent of Computerized Tomographic (CT) scan and discovery of potent antibiotics have been shown to impact positively on the outcome of these abscess collections. The mortality rate due to brain abscess has reduced from 38% during the 1950s to 25% in the 1980s and 5–10% at present. Despite this reduction in the unacceptably high mortality, brain abscess remains a serious and potentially life threatening infection particularly in children. [1–3] Over the past four decades, a change in the predisposing factors in favour of odontogenic infections have been demonstrated. [4] Together with cranial subdural and epidural abscess collections, brain abscess could manifest as space occupying lesions requiring emergency neurosurgical intervention such as burr hole aspiration, craniotomy, or stereotactic aspiration. [5–7] Antibiotic administration may occasionally be the mainstay of treatment, and is recommended in all cases of intracranial abscess collection for a period of 4–6 weeks. [8, 9] Hyperbaric oxygen therapy have proved to be an important adjunct in the management of multiple, deep-seated abscesses with atypical causative organisms. [10, 11] It is hoped that this study will identify the clinico-demographic pattern and outcome of management of intracranial abscesses in our setting over an 8 year period (2007–2015).

2. Materials & Methods

A retrospective study of patients managed for intra-cranial abscesses in Ahmadu Bello University Teaching Hospital, Zaria between January 2007 – October 2015 was conducted. The hospital is a major referral centre located in the heart of Northern Nigeria. Medical records of the patients were retrieved from the central library, operating theatres and Microbiology laboratory, and relevant information including demographics, neurological status at admission, clinical presentation, predisposing factors, anatomical location, number of lesions, surgical techniques, organisms cultured, and the neurological outcome were extracted. Data were analysed using SPSS version 21.

3. Results

37 patients' clinical information were obtained and analyzed. 30 were males (81.1%) and 7 were females (18.9%) giving a Male-Female ratio of 4.3:1. The Ages of the patients ranged from 3 months to 60 yrs (mean 21 yrs).

Table 1. Age distribution of patients with intracranial abscesses.

Age (yrs)	No. of Patients	Percentage
< 1	5	13.5
1–10	6	16.2
11–20	8	21.6
21–30	8	21.6
31–40	5	13.5
41–50	2	5.4
51–60	3	8.1
Total	37	100

Clinical features of patients at presentation are shown in Fig. 1. Convulsion is the most common feature in 68% of

patients. Headache and fever were present in 66.6% and 58.3% respectively. Intra-cerebral abscess accounted for 67.6% (25) of intracranial abscesses followed by subdural empyema which was found in 8 patients (21.6%). Intra-ventricular abscess was the least observed accounting for only 2.7%. (See Fig 2.)

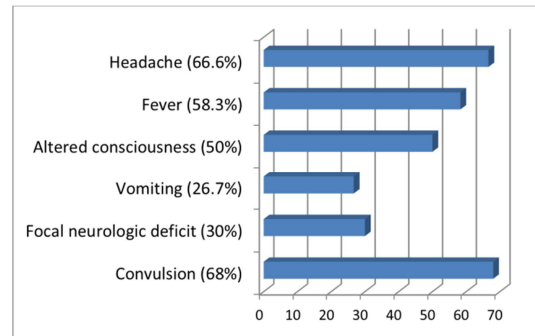


Fig. 1. Clinical Features of Patients with Intracranial abscess on Presentation.

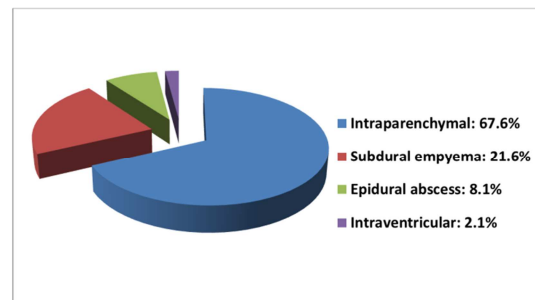


Fig. 2. Distribution of forms of Intra-cranial abscesses.

Parietal lobe, alone or with other cerebral lobes was the common seat of intra-parenchymal (brain) abscess and is implicated in 68% (n=25) of patients. The Temporal lobe is the least involved, and was found in 4% of patients. Multiple brain lobes were affected in 11 Patients (44%). (See Table 2.)

Table 2. Locations of Brain abscess in Zaria.

Location	Frequency	Percentage
Frontal Lobe	7	28
Parietal Lobe	17	68
Occipital Lobe	6	24
Temporal Lobe	1	04
Multiple	11	44

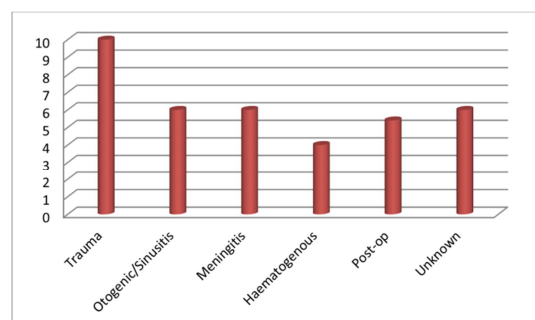


Fig 3. Aetiology of Intracranial abscesses.

36 of the 37 patients (97.3%) had a form of surgical intervention. The most frequent treatment modality was Burr hole+ aspiration which was done in 23 patients (63.9% of surgeries). Six Patients (16.9%) had Craniotomy and drainage, Five patients (13.6%) had elevation of depressed skull fracture with drainage of abscess.

The volume of abscess drained ranged between 8-200mls

Table 3. Diagnosis, Treatment Modalities and Outcome of treatment of Intracranial abscess.

	Brain abscess	Subdural abscess	Epidural abscess	Intraventricular abscess	TOTAL
Sex					
Male	21(84%)	6(75%)	2(66.7%)	1	30(81.1%)
Female	4(6%)	2(25%)	1(33.3%)	0	7(18.9%)
TOTAL	25(100%)	8(100%)	3(100%)	1	37(100%)
Treatment					
Burr hole	16	6	1	0	23 (63.9%)
Craniotomy	4	1	1	0	6(16.7%)
*# Elevation	4	1	0	0	5(13.9%)
Others	0	0	1	1	2(5.5%)
TOTAL	24	8	3	1	36(100%)
Total					

* #- Fracture Elevation

4. Discussion

Intracranial abscesses remain important emergency conditions the modern day Neurosurgeon may have to contend with particularly in the developing countries where it could represent up to 14.3% of Intracranial space occupying lesions. [12] They affect both the young and old, and are generally commoner in males from our findings which is consistent with findings elsewhere. [13–15] We noticed the first decade of life to have the highest burden with 29.7% of all patients falling within this age range. A closer look at the figures showed that 72.9% of all our patients were ≤ 30 years. Hence, intracranial abscesses are predominantly disease of the young. [12, 15, 16]

Trauma was the most common implicated aetiological factor among our patients (27%) followed by Otogenic infections/sinusitis and Meningitis found in 16.2% of patients respectively. The significant risk of developing Otogenic infections, Meningitis and Trauma among the young age group thereby predisposing them to intracranial abscess formation could explain the higher risk of abscess collection in these age groups. These 3 aetiological factors have also been demonstrated to be the most common among children < 17 years by Djientcheu V. P et al. [12] This notwithstanding, aetiological factor may not be identified in some cases. This was true in 23.4% of our patients. Similar figures have been reported in Yaounde (20%), Dublin (19.2%), and Helsinki (27%). [12, 13, 16]

Convulsions were the most common clinical feature (68%) followed by headache and fever among our patients. Fever was found in 58.3%. Clinical presentation could be greatly variable and could be modified by the underlying aetiology such as meningitis, traumatic head injury, size of the abscess and presence of co-morbidities in the patients. [17, 18] Therefore high index of suspicion is necessary for prompt diagnosis to be made. Intracranial abscesses could collect in

with an average of 65.8mls. Culture of abscess yielded no growth in 57.9% (n=19). Isolated organisms include *Escherichia coli* (21.1%), and *Staphylococcus aureus* (15.8%). 86.6% of operated patients had Glasgow outcome score of ≥ 4 . Mortality rate was 5.4% among all categories of patients.

any of the epidural, subdural, intra-parenchymal or intraventricular spaces. 67.6% of these abscesses in our patients were Intra-cerebral. Subdural empyema was the 2nd most common (26.1%), and the least was intra-ventricular abscess (2.1%). Similar findings were also reported in Taiwan where subdural empyema was more common than epidural abscess. [19]

Intra cerebral abscess can be formed in any of the cerebral lobes. In seventeen of our patients (68%), the Parietal lobe was involved making it the most commonly affected lobe. However, the site of eventual abscess formation depends on the source of the infection. [1, 7, 19] The diagnosis of Intracranial abscess and management have been revolutionized by the advent of Computerized Tomographic (CT) scan. [17, 21–23] CT scan without and with contrast was used to arrive at diagnosis in all our patients with cardinal features being contrast-enhancing circumscribed lesion(s) with peri-lesional oedema.

Medical therapy was commenced in all patients using intravenous Ceftriaxone and Metronidazole prior to surgical intervention, and the antibiotics were continued for a total period of 6 weeks depending on sensitivity pattern. Anticonvulsants were used when adjudged necessary. The best candidates for medical therapy alone appear to be those with small abscess (< 2.5 cm) and good initial clinical condition (GCS > 12). [5, 9] All our patients had abscess size > 3 cm and so had surgical intervention. Burr hole and aspiration of abscess was used to manage 23 patients (63.9%) with only 1 mortality recorded (Post tumour excision abscess). In 88.9% of cases Glasgow Outcome score was ≥ 4 . This treatment modality is particularly important in the armamentarium of Neurosurgeon in any developing country as it is cheap, easy, quick, can be done under local of general anaesthesia and does not require elaborate theatre preparations which are important causes of delay. The efficacy of burr hole have also been reported by several

researchers. [22, 24, 25] Where this technique may not be adequate, craniotomy should be done to address other conditions. Most of our culture yielded no growth. This may not be surprising as all patients were on a form of antibiotics prior to abscess drainage, and also the limitation of culturing techniques for obligatory anaerobes and other special culture techniques in our laboratory.

Overall, 86.6% of operated patients had Glasgow outcome score of ≥ 4 . Two patients died giving mortality rate of 5.4%. Of these, one of the patient died before been operated upon (She was septic on presentation with background retroviral disease and GCS of 3). Operative mortality was thus 2.2%. Two patients (5.4%) had persistent seizures post operatively which were controlled with anti-epileptic drugs. Patients were followed up for a period ranging between 3 months and 36 months. These findings underscore the need for prompt access to neurosurgical care which has been suggested to decrease secondary intracranial collections. [26]

5. Conclusion

When properly identified and managed, intra-cranial abscesses do have an acceptable outcome. High index of suspicion should be exercised in patients with traumatic head injury, and children being managed for acute bacterial meningitis or otitis media. From our findings, we conclude that burr hole and aspiration and antibiotics for 4-6 weeks are effective in management of intracranial abscesses when properly applied. Trauma is the most common aetiological factor, and the burden of this pathology is enormous on the young population who are the future of the society.

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